

What is claimed is:

1. A device for generating chlorine trifluoride using a plasma reactor (100) and plasma generating means (110, 120, 130, 150, 155, 160, 170, 180) via which a high-density plasma (105) can be generated in the interior of the plasma reactor (100), gas supply means (21, 25, 22, 26) being provided via which a first gas and a second gas can be supplied to the plasma reactor (100), these gases reacting with one another under the influence of the high-density plasma (105) in the plasma reactor (100), forming chlorine trifluoride, and a gas outlet (20) being provided via which the formed chlorine trifluoride can be removed from the plasma reactor (100).
2. The device as recited in Claim 1, wherein the plasma generating means include a coil (110), an adaptation network (120), and a high-frequency generator (130).
3. The device as recited in Claim 1, wherein the plasma generating means include a microwave hollow conductor (150), tuning elements (155), a magnetron (170), a circulator (160), and a hollow conductor terminating element (180).
4. The device as recited in Claim 1, wherein the plasma reactor (100) includes a quartz tube or a hollow quartz body having a polished interior wall in particular, or a ceramic tube or a hollow ceramic body having a polished interior wall in particular and/or being made of aluminum oxide.
5. The device as recited in Claim 1, wherein the gas supply means (21, 22, 25, 26) include a first mass flow regulator (22) via which the quantity of the first gas, which is supplied to the plasma reactor (100), is adjustable, and the gas supply means (21, 22, 25, 26) include a second mass flow regulator (26) via which the quantity of the second gas, which is supplied to the plasma reactor (100),

is adjustable.

6. A system for etching semiconductor substrates, silicon wafers in particular, having a device (6) as recited in one of the preceding claims, a process chamber (10), which is connected to the plasma reactor (100) via the gas outlet (20), being assigned to it, the semiconductor substrate (30) being situated in the process chamber (10) and being exposed to the gaseous chlorine trifluoride generated by the device (5) for generating chlorine trifluoride.

7. A method for generating chlorine trifluoride, a high-density plasma (105) being generated in a plasma reactor (100), and a first gas and a second gas, which react with one another under the influence of the high-density plasma (105) in the plasma reactor (100), forming chlorine trifluoride, being supplied to the plasma reactor (100).

8. The method as recited in Claim 7, wherein the high-density plasma (105) is generated using inductive high-frequency excitation or microwave excitation.

9. The method as recited in Claim 7 or 8, wherein a gas which contains or is composed of Cl<sub>2</sub> or HCl is used as the first gas, and a gas which contains or is composed of NF<sub>3</sub>, F<sub>2</sub>, SF<sub>6</sub> is used as the second gas.

10. The method as recited in one of Claims 7 through 9, wherein oxygen as an additional gas is supplied to the plasma reactor (100) or to a process chamber (10) downstream from the plasma reactor (100).

11. The method as recited in one of Claims 7 through 10, wherein the generated chlorine trifluoride is separated from other gas components, hydrogen fluoride in particular, using a filter downstream from the plasma reactor (100).